

# COMPUTER INFORMATION SYSTEMS

Division: Business and Computer Information Systems

## Division Dean

Dr. Carlos Ayon

## Faculty

Anna Carlin  
Dale Craig  
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Brian Roach  
Jane Troop  
Nancy Woolridge

- Computer Information Systems Associate in Science Degree (<https://catalog.nocccd.edu/fullerton-college/degrees-certificates/computer-information-systems/computer-information-systems-associate-science-degree/>)
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**CIS 100 F Introduction to Personal Computers** **4 Units**  
72 hours lecture per term. This course introduces students as well as the business professional to the use of the personal computer using state-of-the-art software. Course material includes computer literacy, information literacy, concepts, hardware, software, information systems, structured design techniques, overview of the computer industry, ethics and current issues including virus protection and prevention. Students will also learn how to use the Windows operating system, Microsoft Office (Word, Excel, PowerPoint, Access) and the Internet as it relates to Microsoft Office. This course will satisfy the Area E General Education Requirements for transfer to CSU. (Degree Credit) (CSU) AA GE, CSU GE

**CIS 100HF Honors Introduction to Personal Computers** **4 Units**  
72 hours lecture per term. This Honors-enhanced course introduces students as well as business professionals to the use of the personal computer using state-of-the-art software. Course material includes computer literacy, information literacy, concepts, hardware, software, information systems, structured design techniques, overview of the computer industry, ethics and current issues including virus protection and prevention. Students will also learn how to use the Windows operating system, Microsoft Office (Word, Excel, PowerPoint, Access) and the Internet as it relates to Microsoft Office. (Degree Credit) (CSU)

**CIS 102 F Introduction to Open Source Software** **3 Units**  
54 hours lecture per term. This course teaches students to use various Open Source software on a Windows computer. Topics include finding Open Source Software, downloading and installing software, and using typical packages like Open Office and Open CD. Students will also learn how to participate in the Open Source community. (Degree Credit) (CSU)

**CIS 103 F Computer Keyboarding** **2 Units**  
36 hours lecture and 18 hours lab per term. This is course is beginning keyboarding for students who wish to learn alphanumeric keyboarding and the 10-key pad. Individualized assignments will help students achieve increased speed and accuracy. (Degree Credit) (CSU)

**CIS 104 F Presentation Graphics** **3 Units**  
54 hours lecture and per term. This course is an introduction to business presentation graphics. Topics include planning presentations, creating business presentations and templates, enhancing presentations with graphics, sound, animation, transition, and video and using presentations on a Web server. State-of-the-art software will be used. (Degree Credit) (CSU)

**CIS 106 F Beginning Spreadsheet (MS Excel)****3 Units**

54 hours lecture per term. This course provides an introduction to spreadsheets in the solution of business problems. Students will create, format and print worksheets that include formulas, functions, charts, relative and absolute cell references, what-if analysis, and 3D worksheets. Students will learn how to create Excel Web pages, design and manipulate Excel tables, and work on group collaboration projects. State-of-the-art software will be used. (Degree Credit) (CSU)

**CIS 107 F Introduction to Operating Systems****3 Units**

54 hours lecture per term. This course is designed to introduce the operating system on the personal computer and personal computer security. The course will cover the fundamentals of the graphical user interface, mouse operations, how to manipulate the interface, how to use help, search, launch applications, manage files and folders and add/delete hardware and software. Additional topics include Linux, OSX, the Cloud, using end point security software, how virus programs infect computers, and how to protect computers from malicious programs. (Degree Credit) (CSU)

**CIS 109 F Personal Computer Security****2 Units**

27 hours lecture and 27 hours lab per term. This course introduces the student to computer security topics on personal computers and on the Internet. Students will learn how to protect their own personal computers from malicious software to include trojans, malware, adware, viruses, and other dangerous software. Students will understand current hacking techniques and approaches and learn to protect their personally identifiable information (PII) on the Internet and how to securely send information. (Degree Credit) (CSU)

**CIS 111 F Introduction to Information Systems****4 Units**

72 hours lecture per term. This course exams information systems and their role in business. Focus will be on information systems, database management systems, networking, e-commerce, ethics and security, computer systems hardware and software components. Application of these concepts and methods through hands-on projects developing computer-based solutions to business problems. (Degree Credit) (CSU) (UC) AA GE (C-ID: BUS 140, ITIS 120)

**CIS 111HF Honors Introduction to Information Systems****4 Units**

72 hours lecture per term. This Honors-enhanced course is an examination of information systems and their role in business. This course will focus on information systems, database management systems, networking, e-commerce, ethics and security, computer systems hardware and software components. Application of these concepts and methods through hands-on projects, developing computer-based solutions to business problems. As an Honors course, this class will include enrichment content and activities requiring independent problem-solving and critical thinking skills and collaborative group projects and presentations. (Degree Credit) (CSU) (UC) AA GE (C-ID: BUS 140, ITIS 120)

**CIS 113 F Intro to Big Data Analytics****2 Units**

36 hours lecture per term. This course introduces terminology and basic concepts behind big data analytics, applications, and systems. Topics include: what is data analytics, process and tools, statistics and visualization. (Degree Credit) (CSU)

**CIS 120 F Project Management I****3 Units**

54 hours lecture per term. This course covers project management application skills including planning project scope, analyzing project risk, creating project schedules, communicating project information, managing resources, adding tasks and durations, changing relationships, tracking progress, and closing the project. Also covered are customizing project management software, web resource, and project management certifications. State-of-the-art software will be used. (Degree Credit) (CSU)

**CIS 123 F Beginning Word Processing (MS Word) (formerly Word Processing)****3 Units**

54 hours per term. This course is designed to teach the student how to use a word processing program to create, edit, and format documents. This course covers the fundamental operations of word processing: typing text, saving, editing, copying, moving, printing, formatting, margins, tabs, footers and headers, footnotes, vertical and horizontal alignment and line spacing. Students will also learn how to create an index, table of contents, and create complex documents that include images. (Degree Credit) (CSU)

**CIS 124 F Advanced Word Processing (MS Word) (formerly Advanced Word)****3 Units****Advisory:** CIS 123 F.

54 hours lecture per term. This course teaches advanced concepts and techniques for Microsoft Word. Topics include working with long documents, complex formatting, collaborating, and automating Word documents. (Degree Credit) (CSU)

**CIS 130 F Systems Analysis and Design****3 Units**

54 hours lecture per term. This course is designed to introduce the student to systems analysis and design concepts as they are applied in business environments. Topics emphasize methodologies used by the analyst throughout the systems development life cycle to analyze business problems or opportunities, address user needs, perform feasibility studies, specify business requirements through process, data and logic modeling, consideration of development alternatives, and implementation and maintenance of systems. (Degree Credit) (CSU)

**CIS 142 F Database I****3 Units**

36 hours lecture per term. This course is designed to teach use of state-of-the-art personal database software. The course will cover introductory concepts including database structure and design, editing database records, sorting/indexing records, query techniques, custom form creation, database report design and printing, database relational techniques, and general file management techniques. (Degree Credit) (CSU)

**CIS 148 F Introduction to Personal Computer Communications****2 Units****Advisory:** Familiarity with sending and receiving email.

27 hours lecture and 27 hours lab per term. This course is an introduction to personal electronic communications and management using state-of-the-art email and scheduling software. Students learn how to connect the software with internet email servers and how to receive and manage email. Students will also learn to manage an electronic calendar, schedule appointments and manage appointment information. (Degree Credit) (CSU)

**CIS 149 F Internet Entertainment****3 Units**

54 hours lecture per term. This course teaches the various elements of entertainment on the Internet. These include how media companies are using the Internet for content distribution and marketing, how various types of Internet Entertainment programs work th client operating systems like Windows, and how to configure clients to use various Internet Entertainment packages. (Degree Credit) (CSU)

**CIS 150 F Introduction to the Internet 3 Units**

54 hours lecture per term. This course is an introduction to the organizational, operational, and technical aspects of the internet. Students will learn how to use a personal computer to access internet and the World Wide Web. Topics include an overview of personal computer operations, the history and philosophy of the internet and its services, configuring a personal computer to connect to the internet, selecting an internet service provider, sending and receiving electronic mail (email), locating network resources using search engines, participating in discussion groups using Web 2.0, downloading internet software. Other topics include developing, creating and posting personal and business web pages using the hypertext markup language (HTML), evaluating internet materials for accuracy and reliability and citing web and internet resources. (Degree Credit) (CSU)

**CIS 152 F Web Design I (formerly Web Page Design II) 3 Units**

54 hours lecture per term. This course presents introductory and advanced topics in Web Page Design. Students will learn how to create web pages that include style sheets, use multimedia objects, plan and manage large-scale websites, use client plug-ins, work with CGI, Java, and other server side technologies, design effective user interfaces, and use elements of dynamic HTML. Other topics include using JavaScript, working with different types of graphic objects, and working with the Document Object Model. Emphasis is placed on learning the Hypertext Markup Language, using and editing graphic files, and creating various types of web pages. (Degree Credit) (CSU)

**CIS 153 F Business Web Graphics 3 Units**

54 hours lecture per term. This course teaches the skills necessary to create business graphics for web pages. Topics include graphic file formats used on web pages, designing and manipulating web components using a graphical editor, using graphical elements in web page design, and generating CSS layers as a result of image slicing. Students will also learn how to effectively optimize images, create hyperlinks from image comps, create navigation elements, add animation, and export HTML and images as part of the overall design of a business web page. (Degree Credit) (CSU)

**CIS 154 F JavaScript Programming I 3 Units**

54 hours lecture per term. This course teaches the student to use the JavaScript programming language with Hyper-Text Markup Language (HTML) pages. Emphasis is placed on creating HTML pages that include JavaScript programs. The student will learn the basic syntax of the JavaScript language, how to create JavaScript programs inside HTML documents, and how to use JavaScript programs to enhance Web pages. (CSU) (Degree Credit)

**CIS 155 F Web Page Multimedia Design I 3 Units**

**Advisory:** CIS 152 F

This course introduces students to Multimedia Web Design using Adobe Flash CS5 (or current version). Topics include how to create animations and movies for integration into websites and how to create a full website using Flash. Various animation techniques, adding sound, and basic ActionScript for controlling the flow of the movie will be taught. (Degree Credit) (CSU)

**CIS 157 F Web Design II (formerly Dreamweaver I) 3 Units**

**Advisory:** CIS 152 F.

54 hours lecture per term. This course covers using Dreamweaver to create Web pages. Topics include creating web pages with graphics, links, tables, forms, and Javascript elements. Students will also learn how to import files and graphics into Dreamweaver from other programs. Students should have a working knowledge of the Internet. (Degree Credit) (CSU)

**CIS 159 F Introduction to XML 3 Units**

54 hours lecture per term. This course teaches the basic concepts of XML. Topics include the structure of an XML document, creating XML documents, using Data Definitions, and linking XML documents to other web components. Students should have a working knowledge of HTML. (Degree Credit) (CSU)

**CIS 160 F Introduction to Cyber Security (formerly Introduction to Computer Forensics) 3 Units**

54 hours lecture and 18 lab hours per term. In this course, students will be introduced to the complex world of cyber security and technology. Students will analyze security problems and practice simulated security activities. Topics will address technologies and security-related topics progressing from individual computers to more complex internet-based systems. (Degree Credit) (CSU)

**CIS 165 F Cyber Security and Networking and Web (formerly Computer Forensics and Networking) 3 Units**

**Advisory:** Basic knowledge of networking concepts.

54 hours lecture and 18 hours lab per term. This course teaches the student how to use computer forensic techniques and tools to investigate and reconstruct network-based data. Students learn the basic operation and structure of a computer network, the various network devices and their operation, and the tools used to investigate a network. Topics include trapping network data, retrieving and analyzing email, tracing network packets, and other security and forensic topics. (Degree Credit) (CSU)

**CIS 166 F Cyber Security and Operating Systems (formerly Operating Systems and Computer Forensics) 3 Units**

**Advisory:** CIS 160 F.

54 hours lecture and 18 hours lab per term. This course teaches students how to perform computer forensic analysis of data on the Windows, Linux, and Macintosh operating systems. Students will learn about the internals of the operating system, the potential security problems with the operating system, and how to capture static and live data from an operating system. Students will also learn to use some typical network software and hardware forensic tools and how to protect gathered data in a legally acceptable manner. (Degree Credit) (CSU)

**CIS 168 F Cyber Security Software Tools (formerly Tools for Computer and Network Forensics) 3 Units**

**Advisory:** Basic knowledge of C++

54 hours lecture and 18 hours lab per term. This course teaches students how to use various hardware and software tools to engage in computer and network forensics. Topics include installing, configuring, and using common open source forensic tools, building custom tool kits, modifying tools, and creating new tools. Students will learn how to use C++ to write custom computer and network forensic software tools. (Degree Credit) (CSU)

**CIS 170 F Cisco Networking 1 3 Units**

36 hours lecture and 54 hours lab per term. This course focuses on network terminology and protocols. Local Area Networks (LANs), Wide Area Networks (WANs), Open System Interconnection (OSI) model, cabling, cabling tools, routers, router programming, Ethernet, Internet Protocol (IP) addressing, and network standards. This course is offered through Cisco Local Academy and upon successful course completion, students will receive a certificate from Cisco. (Degree Credit) (CSU)

**CIS 171 F Ethical Hacking (formerly Network Intrusion and Detection)****3 Units**

**Advisory:** Basic knowledge of a network operating system and basic networking concepts

54 hours lecture and 18 hours lab per term. This course teaches ethical hacking through network intrusion and detection techniques. Students learn how computer network security is compromised by use of common intrusion tools. Students also learn how to detect such network intrusions and how to monitor and trap the intruder. Topics include how to successfully penetrate Windows and Linux networks and how to install and use open source tools to detect and protect from such penetration. (Degree Credit) (CSU)

**CIS 172 F Cisco Networking 2****3 Units**

**Prerequisite(s):** CIS 170 F with a grade of C or better

36 hours lecture and 54 hours lab per term. This course introduces students to router fundamentals, router setup and configuration, network management, routing and routed protocols, and network troubleshooting. Topics include: managing Cisco IOS software, Distance Vector Routing Protocols, TCP/IP suite error and control messages, basic router troubleshooting, and access control lists. This course is offered through Cisco Local Academy and upon successful course completion students receive a certificate from Cisco. (Degree Credit) (CSU)

**CIS 173 F Cisco Networking 3****3 Units**

**Prerequisite(s):** CIS 172 F with a grade of C or better

36 hours lecture and 54 hours lab per term. This course focuses on advanced IP addressing techniques, Variable Length Subnet Masking (VLSM), intermediate routing protocols (RIP v2, single-area OSPF, EIGRP), command-line interface configuration of switches, Ethernet switching, Virtual LANs (VLANs), Spanning Tree Protocol (STP) and VLAN Trunking Protocol (VTP). This course is offered through Cisco Local Academy and upon successful course completion, students will receive a certificate from Cisco. (Degree Credit) (CSU)

**CIS 174 F Cisco Networking 4****3 Units**

**Prerequisite(s):** CIS 173 F with a grade of C or better

36 hours lecture and 54 hours lab per term. This course focuses on advanced IP addressing techniques; Network Address Translation (NAT), Port Address Translation (PAT), and DHCP; WAN technology and terminology; PPP, ISDN, DDR, Frame Relay, network management, and introduction to optical networking. This course is offered through Cisco Local Academy and upon successful course completion students will receive a certificate from Cisco. (Degree Credit) (CSU)

**CIS 176 F Web Page Layout with CMS****3 Units**

**Advisory:** CIS 152 F

54 hours lecture per term. This course provides students with the knowledge, skills, and hands-on experience to create, enhance, and maintain a website created with a content management system (CMS). Students will design sites with articles, blogs, links, news feeds, search components, and other plugins. Knowledge of HTML is highly recommended. (Degree Credit) (CSU)

**CIS 177 F Web Design III (formerly Dreamweaver II)****3 Units**

**Advisory:** CIS 157 F or ability to use current version of Dreamweaver to create standards complaint websites is strongly recommended.

54 hours lecture per term. This project-based, hands-on course uses intermediate development techniques in Dreamweaver to enhance business web pages. Topics include the use of style sheets to create custom classes, link styling, and position elements; manage template-controlled sites, and navigation element control and accessibility. Students will also learn to manage Dreamweaver extensions. (Degree Credit) (CSU)

**CIS 180 F Introduction to Networking Concepts****4 Units**

72 hours lecture per term. This class introduces the student to data communications and networking concepts used in businesses. Topics include the major components of data communications networks, local area networks, wide area networks, networking topologies, network protocols, inter-networking, and categorizing network operating systems. (Degree Credit) (CSU)

**CIS 181 F Computer Certification Preparation****3 Units**

Letter Grade or Pass/No Pass option. 54 hours lecture per term. This course prepares students for industry standard certifications with both theoretical and practical lessons relating to microcomputer hardware and software. Emphasis is placed on how hardware components function together to make a microcomputer work properly, how software interacts with hardware, and practical methods to protect hardware and software. Topics include installing, configuring, and upgrading personal computer components and peripherals in a networked environment. (Degree Credit) (CSU)

**CIS 182 F Computer Certification Prep II****3 Units**

54 hours lecture per term. This course prepares students for industry standard certifications with both theoretical and practical lessons relating to computer hardware and software. Emphasis is placed on how software components function together to make a computer system work properly, how software interacts with hardware, and practice methods to protect hardware and software. Topics include installing, configuring, and upgrading software components in a networked environment. (Degree Credit) (CSU)

**CIS 183 F Network Security Fundamentals****3 Units**

**Advisory:** CIS 107 F and CIS 180 F

54 hours lecture per term. This course is designed to provide students with an overview of network security, and covers terminology, technology, and software used with network security. Students will learn about communication security, infrastructure security and cryptography. Business plans for disaster recovery will be covered. (Degree Credit) (CSU)

**CIS 200 F Fundamentals of Computer Programming****1 Unit**

**Advisory:** Knowledge of elementary computer concepts

18 hours lecture per term. This course will introduce basic programming terminology, concepts, and best practices related to computer programming. Students will learn the basics of writing programs using loops, statements, variables, and functions. Additional topics will include program design, flow charting, basic computer architecture and debugging techniques. (Degree Credit) (CSU)

**CIS 201 F Introduction to Python Programming****3 Units**

54 hours lecture per term. This course is an introduction to fundamental concepts and techniques for writing software in the Python programming language. This course covers the syntax and semantics of data types, expressions, exceptions, control structures, input/output, methods, classes and pragmatics of Python programming. (CSU) (Degree Credit)

**CIS 205 F Advanced Spreadsheet - MS Excel (formerly Spreadsheet****Advanced MS Excel)****3 Units**

**Advisory:** CIS 106 F or the ability to create and edit a spreadsheet

54 hours lecture and 18 hours lab per term. This course teaches advanced concepts with Microsoft Excel. Topics include PivotTables and PivotCharts, using advanced statistical, logical, financial and lookup functions, creating macros, templates and styles and prepare workbooks for distribution. Use of collaboration tools and advanced analysis are included. (Degree Credit) (CSU)

- CIS 210 F Advanced Python Programming** 3 Units  
**Advisory:** Students should be familiar with the Python programming language and understand basic statistics.  
 54 hours lecture per term. This course covers advanced topics in Python programming. Subjects include: file utilization, classes and inheritance, GUI interfaces along with dictionaries, sets and recursion. Students should be familiar with the Python programming language. (Degree Credit) (CSU)
- CIS 212 F Robotic Programming** 3 Units  
 54 hours lecture per term. This class teaches basic programming concepts by creating applications for physical robotic devices. Students will learn how to connect to these robotic devices, how to design a program that controls the device, and how to download their program to the device. Programming topics include looping, making decisions, variables, and arrays. (Degree Credit) (CSU)
- CIS 213 F Python for Data Analytics** 2 Units  
**Advisory:** Students should be familiar with the Python programming language and understand basic statistics.  
 36 hours lecture per term. This course introduces students to analyzing data using Python. Students will learn how to obtain, cleanse and prepare data for analysis. Data analytic and statistical tools will be used to visualize data, predict outcomes and categorize data. (Degree Credit) (CSU)
- CIS 215 F Excel Data Analy Big Data** 3 Units  
**Advisory:** Students should be familiar with spreadsheet software and understand basic statistics.  
 54 hours lecture per term. This course provides students with a strong foundation of skills that are needed to become proficient in data analytics. Microsoft Excel is the ideal platform for students who are in the early stages of learning the fundamentals of data analytics. The ability to visually observe the architecture of several datasets in Excel is a great advantage when learning how to use data analytics techniques to produce solutions for both professional and personal projects. (Degree Credit) (CSU)
- CIS 217 F Visual Basic Programming I** 4 Units  
**Advisory:** CIS 100 F or an understanding of basic computer programming concepts  
 72 hours lecture per term. This course covers the fundamentals of the Microsoft Visual Basic programming language. Emphasis is on variables, objects, events, methods, properties, control structures and error trapping. Forms, controls and basic use of an IDE are presented. An introduction to the development cycle, graphical user interface design principles, and documentation is provided. (Degree Credit) (CSU) (UC Credit Limitation)
- CIS 219 F Visual Basic Programming II** 3 Units  
**Advisory:** CIS 217 F  
 54 hours lecture per term. This course covers various specialized visual basic programming tasks including database management, component level programming, XML processing, distributed network programming, and embedded device programming. Students learn to create programs that read and write to databases, which are structured as components, process XML files, and can be distributed across a network. (Degree Credit) (CSU)
- CIS 220 F Web Server Programming** 3 Units  
**Advisory:** CIS 152 F.  
 54 hours lecture per term. This course covers topics on Web programming for the Internet and Intranets. Topics include an explanation of how programs are run across the Internet, the various types of Web programs, and how information is loaded into network databases. Programming for both clients and servers will be covered in this class. Students should have a background in Web page design with HTML and have a background in Visual Basic programming. (Degree Credit) (CSU)
- CIS 221 F Introduction to C# Programming** 3 Units  
 54 hours lecture per term. Students will learn basic programming concepts including variables, logical constructions, and data access. Students will also learn to use the C# programming language to create graphical user interface programs, web programs, and database programs. (Degree Credit) (CSU)
- CIS 222 F Computer Scripting (formerly CGI/Perl Scripting)** 3 Units  
**Advisory:** CIS 152 F.  
 54 hours lecture and 36 hours lab per term. This course teaches the Perl scripting language. Topics include using Perl in Web Pages with CGI, basic Perl syntax, data types and functions. Topics also include using Perl with files and databases. Students must have a working knowledge of HTML. (Degree Credit) (CSU)
- CIS 223 F Programming in C++** 3 Units  
**Advisory:** CIS 226 F.  
 This course is designed for students who have some experience with structured programming techniques. Students will learn the C++ programming language as it applies to business applications. Documenting, coding, entering, computing, and executing programs will take place on the personal computer. (Degree Credit) (CSU) (UC)
- CIS 226 F Java Programming I** 4 Units  
 72 hours lecture per term. This course is an introduction to designing, creating, and debugging Java programs. Students will learn the syntax of the Java programming language, how to design programs using Object Oriented Analysis and Design and how to create stand-alone programs. Emphasis is placed on program design, basic programming constructs including classes, objects, decision structures, repetition structures and inheritance. (Degree Credit) (CSU) (UC)
- CIS 227 F Advanced C# Programming** 3 Units  
**Advisory:** CIS 221 F.  
 54 hours lecture per term. This is an advanced course in C# programming. Students learn how to create C# networking programs, Web Server programs, complex database programs and mobile applications. (Degree Credit) (CSU)
- CIS 228 F Java Programming II** 4 Units  
**Advisory:** CIS 107 F and CIS 226 F.  
 72 hours lecture per term. This course covers advanced topics in Java programming. Topics include collections, interfaces, abstract classes, recursion and databases. Students will learn to flowchart user requirements. Students should be familiar with Microsoft Windows and programming. Students should be familiar with Microsoft Windows and with the Java programming language. (Degree Credit) (CSU)
- CIS 229 F XML Programming** 3 Units  
**Advisory:** CIS 159 F.  
 54 hours lecture and 18 hours lab per term. This course covers XML programming. Topics include using XML parsers in JavaScript and Java, using XML for file input/output, and connecting to XML databases. Students must have a working knowledge of XML. (Degree Credit) (CSU)
- CIS 230 F PHP and MySQL Programming** 3 Units  
**Advisory:** CIS 152 F and CIS 154 F  
 54 hours lecture per term. This course teaches how to use the PHP Web programming language and MySQL database program to create interactive, database-driven Web sites. Students learn how to create PHP enhanced pages, how to install and configure MySQL, and how to connect Web clients to the database. (Degree Credit) (CSU)

**CIS 240 F Intro to Mobile Applications****4 Units****Advisory:** CIS 226 F.

72 hours lecture per term. This course introduces students to creating mobile applications (apps) through software design, program logic, code development and testing, and utilizing appropriate software development tools. Course material includes fundamentals of mobile design, utilizing graphics and animation, developing interactive apps, building multi-screen applications and how to deploy and publish mobile apps. Students will also learn to use advanced software development tools. (Degree Credit) (CSU)

**CIS 242 F Database II****3 Units****Advisory:** CIS 142 F.

54 hours lecture per term. This course teaches advanced topics in personal databases using state-of-the-art database software. Students will learn how to design and implement complex databases, how to create complex queries and how to use Structured Query Language, how to create personal databases with other applications, and how to write database macro programs. Other topics include the theory of database design, interfacing personal databases with external databases, and creating internet personal databases. Students in this course should have fundamental skills in using a personal database. (Degree Credit) (CSU)

**CIS 255 F Web Page Multimedia Design II****3 Units****Advisory:** CIS 155 F.

54 hours lecture per term. This course teaches advanced concepts in Flash. Students learn how to write ActionScript and use advanced features in Flash to create sophisticated websites and animations. Topics include creating dynamic drop-down menus, pre-loaders, working with external movie files and sound, and connecting to a MySQL database. Students should have a working knowledge of beginning Flash concepts. (Degree Credit) (CSU)

**CIS 270 F SQL Server Administration****3 Units****Advisory:** CIS 180 F and CIS 107 F.

54 hours lecture and 18 hours lab per term. This course introduces students to the administration of Microsoft SQL Server. Students learn an overview of the SQL server environment, installing and administering SQL server, user and database management, and operating SQL server in a networking environment. Emphasis is placed on installing and administering SQL server, setting up user accounts and use access, and managing resources. (Degree Credit) (CSU)

**CIS 280 F Introduction to Oracle: SQL and PL/SQL****3 Units****Advisory:** CIS 142 F with a grade of "C" or better

54 hours lecture and 18 hours lab per term. This course offers students an extensive introduction to database technology. The class covers the concepts of relational databases and the powerful SQL and PL/SQL programming languages. Students are taught to create and maintain database objects and to store, retrieve, and manipulate data. In addition, students learn to create PL/SQL blocks of application code that can be shared by multiple forms, reports, and data management applications. Demonstrations and hands-on practice reinforce the fundamental concepts. (Degree Credit) (CSU)

**CIS 281 F Introduction to Networking Hardware****3 Units**

54 hours lecture and 18 hours lab per term. This course builds on students' knowledge of basic networking concepts and theory through hands-on experience. The course will provide students with an in-depth understanding of network infrastructure, standards and technologies. Students will gain hands-on experience with current network design issues, protocols, and components. Hands-on experience will also include working with wired and wireless standards and network components such as servers, routers, switches, hubs and firewalls. (Degree Credit) (CSU)

**CIS 285 F Windows Server****3 Units****Advisory:** CIS 107 F and CIS 180 F

54 hours lecture and 18 hours lab per term. This course introduces students to Microsoft Windows Server and enterprise networks. Students learn an overview of the Windows environment, installing and administering servers, domain management and networking. Emphasis is placed on managing a Windows network, setting up user accounts and user access, and managing resources. (Degree Credit) (CSU)

**CIS 286 F Web Server Management****3 Units****Advisory:** CIS 180 F and CIS 107 F with a grade of "C" or better

54 hours lecture and 18 hours lab per term. This course introduces students to Microsoft Windows Information Server and enterprise networks. Students learn an overview of the Windows environment, installing and administering Internet information server, domain management and networking. Emphasis is placed on managing Internet information server, setting up user accounts and user access, and managing resources. (Degree Credit) (CSU)

**CIS 287 F Exchange Server****3 Units****Advisory:** CIS 180 F and CIS 040 F.

54 hours lecture and 18 hours lab per term. This course introduces students to the administration of Microsoft Exchange Server. Students learn an overview of the Exchange server environment, installing and administering Exchange server, user and database management, and operating Exchange server in a networking environment. Emphasis is placed on installing and administering Exchange server, setting up user accounts and user access, and managing resources. (Degree Credit) (CSU)

**CIS 289 F Windows Active Directory****3 Units****Advisory:** CIS 107 F and CIS 180 F

54 hours lecture and 18 hours lab per term. This course introduces students to Microsoft Windows Active Directory and enterprise networks. Students learn an overview of the Windows environment, installing and administering DNS servers, Active Directory management and networking. Emphasis is placed on managing a Windows Active Directory network, setting up user accounts and user access and managing resources. (Degree Credit) (CSU)

**CIS 290 F Linux and UNIX Operating System****3 Units****Advisory:** CIS 107 F.

54 hours lecture and 18 hours lab per term. This course is an introduction to the Linux/UNIX operating system. Topics include configuring UNIX, using Linux/UNIX utilities to manage files and resources, and using Linux/UNIX on a network. Other topics include configuring common UNIX graphical user interfaces, solving operating system problems, and interfacing Linux/UNIX with other operating systems. Students should be familiar with another operating system such as Microsoft Windows or Windows NT. (Degree Credit) (CSU)

**CIS 295 F Computer Information Systems Internship****2-4 Units**

18 hours lecture and 75-225 hours of supervised employment or 60-180 hours of unpaid internship per term. This course is designed to provide work experience directly related to the student's area of study in Computer Information Systems. This course offers career development opportunities for students and industry professionals who need to strengthen or broaden their skills to retain their current position or wish to advance in their current careers. Course awards 1 unit per 75 hours of paid internship or 1 unit per 60 hours of unpaid internship. (Degree Credit) (CSU)

**CIS 298 F Advanced Computer Topics****3 Units**

54 hours lecture per term. This course introduces advanced topics for students who wish to increase their knowledge and skills in various areas of computer information systems. Emphasis is placed on the current and future trends of information technology in today's computer industry. (Degree Credit) (CSU)